

FIBERGLAS

*Insulations*

FOR

PIPES, FITTINGS AND BOILERS



A.I.A. NO. 37-B



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Reprinted - July, 1949



1980-1981

Topical Collection  
The 1980-1981  
Also see: 1980-1981  
Fiberglass Sheet Glass  
Fiberglass Sheet Glass  
Fiberglass Sheet Glass  
Fiberglass Sheet Glass

1980-1981



TYPICAL COVERING SPECIFICATIONS

1. HOT PIPING
  - (a) Cover all steam pipes and returns, as well as all hot water heating piping and domestic hot water piping and circulation piping installed in the boiler with a standard or suitable thickness of Fiberglas PF Pipe Insulation. Exposed Pipe Covering shall be recovered with canvas neatly pasted on.
  - (b) Cover all fittings, with an equal thickness of Fiberglas Insulating cement, trowelled smooth to match adjoining covering, and recovered with canvas neatly pasted on.
2. COLD PIPING
  - (a) Cover all cold water, soil, waste and horizontal rain-water leaders, with standard thickness of Fiberglas PF Pipe Insulation. Recover with oiled paper and re-finish with canvas neatly pasted on.
  - (b) Cover all fittings with an equal thickness of Fiberglas Insulating cement and Vapour-proof mastic, trowelled smooth to match adjoining covering. Seal all joints before recovering with canvas neatly pasted on.
3. BOILER, TANKS & CONVERTORS

Cover the boiler, hot water storage tanks and convertors with a suitable\* thickness of Fiberglas Metal Mesh Blanket or a suitable\* thickness of Fiberglas blocks securely wired in place. Over metal mesh or blocks stretch and lace poultry netting and apply 1/2" thickness of Fiberglas cement trowelled to a smooth hard finish. Finish with canvas neatly pasted on.
4. BREECHING

Cover the breeching with a suitable\* thickness of Metal Mesh Blankets style "RH" or Fiberglas Insulating Blocks on 1" Hi-Rib expanded metal lath, wired on and finished with 1/2" Fiberglas cement trowelled to a smooth hard finish, with canvas neatly pasted on.
5. PAINTING

Painting shall be done by others.

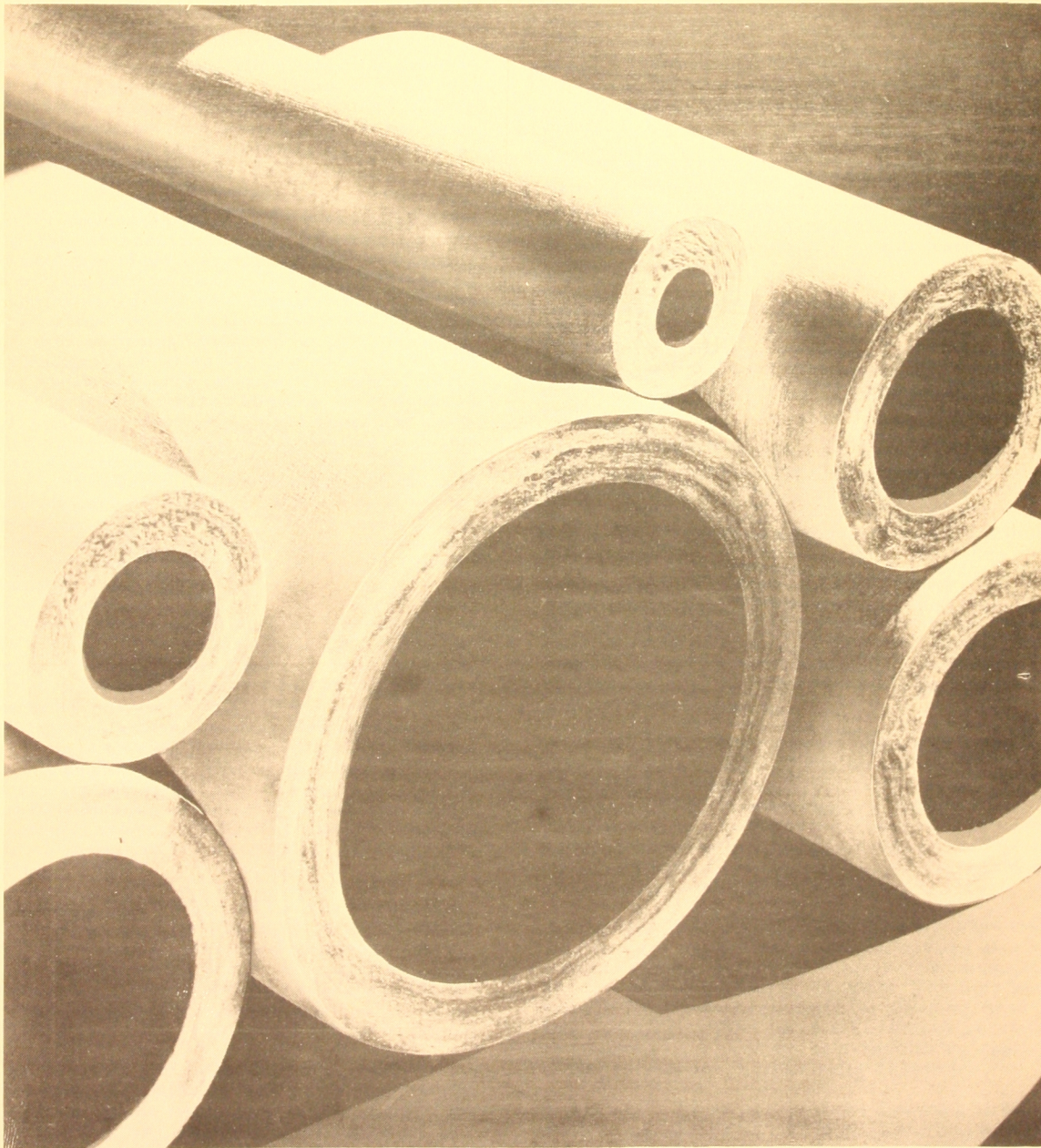
\*Consult chart on page 4 for thicknesses.







FIBERGLAS PF PIPE INSULATION



Fibreglas PF Pipe Insulation is now being made in Canada in a series of prime sizes and thicknesses, which fit exactly over or into another size and thickness. With the new Fibreglas PF Pipe Insulation, stock requirements are cut by about 40%. Accurate shaping of the material to conform exactly with pipe sizes makes joints practically invisible and no offsets or bulges can occur when recommended methods of application are used.







## FIBERGLAS PF PIPE INSULATION

### APPLICATION

Fiberglas PF Pipe Insulation is applied according to standard practices existing in the trade. Applied according to suitable specifications, Fiberglas PF Insulation may be used indoors, outdoors, or underground on pipes operating at temperatures from sub-zero to 600° F.

Muslin-covered hemicylinders are applied by loosening the canvas to open one side, setting the insulation in place around the pipe, and pasting the muslin back in place. The brass-lacquered bands furnished with each hemicylinder are then set in place -- one in the middle and one near each end. Segments, furnished for pipes in excess of 12 inches, are wired in place and covered with the prescribed lagging or protective cover. Whenever insulation is wired in place, three loops of soft annealed wire (16 gauge) should be used. When applying double-layer insulation, the first layer is wired in place with no jacket. The second layer is then set in place with staggered joints to eliminate points of high heat loss. Joints at valves, elbows, or other irregular fittings should be insulated with Fiberglas Insulating Cement and finished the same as the rest of the pipe to present a uniform appearance.

Indoor finishes may be 4, 6, or 8 ounce canvas applied directly over the insulation, or applied over 40-lb. resin-sized paper or 16 lb. asbestos paper. Fiberglas lagging cloth or tape is recommended where fire safety is required or where high temperature or chemical conditions warrant. The surface may be painted. Satisfactory outdoor finishes include 55-lb. roofing felt, sheet metal, or the roofing felt jacket supplied on Fiberglas PF Pipe Insulation, Underground Type. All laps should be securely sealed. Roofing felt should be secured with 16 gauge copper wire loops, six inches on center.

**THERMAL CONDUCTIVITY.** The conductivity of Fiberglas PF Pipe Insulation is exceptionally low. Its structure forms an enormous number of minute air spaces within the material. They provide a high resistance to heat transmission, producing a highly efficient insulation. Conductivity chart is shown in the second column on page 3.

A characteristic of particular importance is the substantial elimination of heat loss through joints. The fibers at the joints tend to knit themselves together so that no measurably greater heat loss occurs at the joints than through the bulk of the covering. The conductivity of sizes 2" and

under is slightly higher than the charted curve; both sizes have a conductivity substantially lower than that of comparable coverings of other materials.

**MOISTURE RESISTANCE.** The individual glass fibers from which Fiberglas PF Pipe Insulation is made are nonhygroscopic and nonabsorbent. Fiberglas PF Pipe Insulation has extremely low moisture absorption (gain in weight from water vapor).

**LIGHT WEIGHT.** Lightness is one of the greater advantages of this pipe insulation. Its inherent lightness facilitates application, packaging and shipping, and makes it possible to ship sections and segments in corrugated paper boxes rather than in crates.

**RUGGEDNESS.** Fiberglas PF Pipe Insulation is tough and resilient. Its high strength-density ratio enables it to resist mechanical shock, making it possible to form and ship large sections. Edges of sections or segments stand up well under careful handling.

**LOAD-BEARING CAPACITY.** Fiberglas PF Pipe Insulation has sufficient load-bearing capacity to withstand occasional weight of workmen who may stand on it during application. Should the pipes be located where the insulation will receive continual abuse, the covering should be protected with suitable sheathing.

**DURABILITY.** Fiberglas PF Pipe Insulation is made from inorganic fibers except for a small percentage of thermo-setting binder used. Prolonged accelerated weathering tests made on Fiberglas fibers, in which succeeding cycles of heat and moisture, cooling and condensation, and heat and drying were imposed have proved the physical and chemical stability of the fibers.

**HANDLING QUALITIES.** Fiberglas PF Pipe Insulation is manufactured in forms that are easily applied. The materials are notably light in weight and are shipped in paper cartons. The pipe insulation has adequate strength for shipping, handling and applications under all ordinary service conditions. Care should be taken during application to prevent it from being dropped.

**SANITARY.** Fiberglas PF Pipe Covering is immune to rot and decay. It is odorless and it will not absorb odors. It provides no sustenance for insects or vermin.







## FIBERGLAS PF PIPE INSULATION

### TOTAL HEAT LOSSES AND EFFICIENCIES

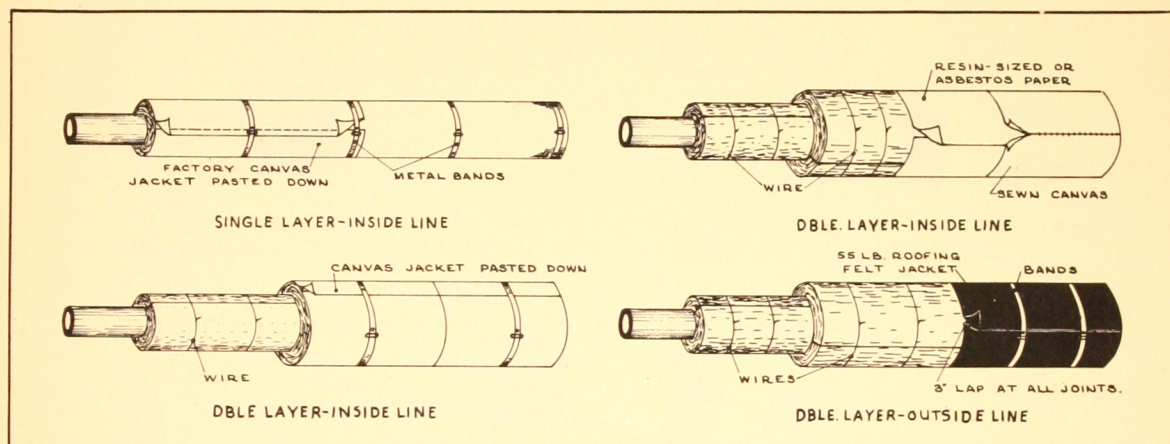
Pipe Surfaces in Still Air at 80°F.

| Temperature of Hot Pipe—°F            |                                       | 150     | 200  | 250  | 300   | 350   | 400   | 450   | 500   | 550   | 600   |
|---------------------------------------|---------------------------------------|---------|------|------|-------|-------|-------|-------|-------|-------|-------|
| Temperature Difference—Pipe to Air—°F |                                       | 70      | 120  | 170  | 220   | 270   | 320   | 370   | 420   | 470   | 520   |
| Thickness of Insulation               |                                       | 2" PIPE |      |      |       |       |       |       |       |       |       |
| Uninsulated Standard                  | Approx. Btu Loss/Hr./Lin. Ft. of Pipe | 90      | 180  | 280  | 400   | 550   | 720   | 910   | 1130  | 1380  | 1680  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 14.0    | 26.0 | 38.5 | 52.0  | 67.0  | 83.0  | 99.0  | 117.0 | 136.0 | 156.0 |
|                                       | Efficiency, %                         | 84.5    | 85.6 | 86.3 | 87.0  | 87.8  | 88.5  | 89.1  | 89.6  | 90.2  | 90.7  |
| 1½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 11.0    | 21.0 | 31.0 | 42.5  | 54.0  | 66.5  | 80.0  | 94.0  | 109.0 | 126.0 |
|                                       | Efficiency, %                         | 87.7    | 88.3 | 88.9 | 89.4  | 90.2  | 90.8  | 91.2  | 91.7  | 92.1  | 92.5  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 8.0     | 15.5 | 23.0 | 32.0  | 41.5  | 52.0  | 64.0  | 77.0  | 91.0  | 105.0 |
| 2"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 91.1    | 91.4 | 91.8 | 92.0  | 92.4  | 92.8  | 93.0  | 93.2  | 93.4  | 93.7  |
|                                       | Efficiency, %                         | 91.1    | 91.4 | 91.8 | 92.0  | 92.4  | 92.8  | 93.0  | 93.2  | 93.4  | 93.7  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 7.5     | 14.5 | 22.0 | 31.0  | 40.5  | 51.0  | 63.0  | 76.0  | 89.5  | 103.5 |
| Double Standard                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 91.7    | 91.9 | 92.1 | 92.3  | 92.6  | 92.9  | 93.1  | 93.3  | 93.5  | 93.8  |
|                                       | Efficiency, %                         | 91.7    | 91.9 | 92.1 | 92.3  | 92.6  | 92.9  | 93.1  | 93.3  | 93.5  | 93.8  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 6.5     | 12.5 | 19.5 | 27.0  | 36.0  | 46.0  | 56.5  | 67.5  | 79.5  | 92.0  |
| 2½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 92.8    | 93.0 | 93.1 | 93.2  | 93.4  | 93.6  | 93.8  | 94.0  | 94.2  | 94.5  |
|                                       | Efficiency, %                         | 92.8    | 93.0 | 93.1 | 93.2  | 93.4  | 93.6  | 93.8  | 94.0  | 94.2  | 94.5  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 5.5     | 10.5 | 16.0 | 23.5  | 31.5  | 40.5  | 50.5  | 61.0  | 72.0  | 83.5  |
| 3"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 93.9    | 94.0 | 94.1 | 94.2  | 94.3  | 94.4  | 94.5  | 94.6  | 94.8  | 95.0  |
|                                       | Efficiency, %                         | 93.9    | 94.0 | 94.1 | 94.2  | 94.3  | 94.4  | 94.5  | 94.6  | 94.8  | 95.0  |
|                                       |                                       | 3" PIPE |      |      |       |       |       |       |       |       |       |
| Uninsulated Standard                  | Approx. Btu Loss/Hr./Lin. Ft. of Pipe | 130     | 250  | 400  | 580   | 790   | 1040  | 1310  | 1630  | 2000  | 2420  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 19.0    | 34.5 | 52.0 | 70.0  | 90.0  | 110.5 | 133.0 | 159.0 | 186.5 | 213.0 |
|                                       | Efficiency, %                         | 85.4    | 86.2 | 87.0 | 87.9  | 88.6  | 89.4  | 89.8  | 90.2  | 90.7  | 91.2  |
| 1½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 14.5    | 26.5 | 40.0 | 54.0  | 69.5  | 85.0  | 101.5 | 119.0 | 136.5 | 155.0 |
|                                       | Efficiency, %                         | 88.8    | 89.4 | 90.0 | 90.7  | 91.2  | 91.8  | 92.2  | 92.7  | 93.2  | 93.6  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 12.0    | 22.0 | 32.5 | 44.5  | 56.5  | 71.0  | 85.0  | 100.0 | 115.5 | 132.0 |
| 2"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 90.8    | 91.2 | 91.9 | 92.3  | 92.8  | 93.2  | 93.5  | 93.9  | 94.2  | 94.5  |
|                                       | Efficiency, %                         | 90.8    | 91.2 | 91.9 | 92.3  | 92.8  | 93.2  | 93.5  | 93.9  | 94.2  | 94.5  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 11.5    | 21.0 | 31.5 | 43.0  | 55.5  | 69.0  | 82.5  | 97.5  | 113.0 | 129.0 |
| Double Standard                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 91.2    | 91.6 | 92.1 | 92.6  | 93.0  | 93.4  | 93.7  | 94.0  | 94.4  | 94.7  |
|                                       | Efficiency, %                         | 91.2    | 91.6 | 92.1 | 92.6  | 93.0  | 93.4  | 93.7  | 94.0  | 94.4  | 94.7  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 10.0    | 18.5 | 28.0 | 37.5  | 48.5  | 60.0  | 72.0  | 84.5  | 98.0  | 112.0 |
| 2½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 92.3    | 92.6 | 93.0 | 93.5  | 93.9  | 94.2  | 94.5  | 94.8  | 95.1  | 95.4  |
|                                       | Efficiency, %                         | 92.3    | 92.6 | 93.0 | 93.5  | 93.9  | 94.2  | 94.5  | 94.8  | 95.1  | 95.4  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 8.5     | 15.5 | 24.0 | 33.5  | 44.0  | 54.5  | 66.0  | 79.0  | 92.5  | 107.0 |
| 3"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 93.5    | 93.8 | 94.0 | 94.2  | 94.4  | 94.8  | 95.0  | 95.2  | 95.4  | 95.6  |
|                                       | Efficiency, %                         | 93.5    | 93.8 | 94.0 | 94.2  | 94.4  | 94.8  | 95.0  | 95.2  | 95.4  | 95.6  |
|                                       |                                       | 4" PIPE |      |      |       |       |       |       |       |       |       |
| Uninsulated Standard                  | Approx. Btu Loss/Hr./Lin. Ft. of Pipe | 160     | 320  | 510  | 740   | 1000  | 1310  | 1660  | 2070  | 2540  | 3070  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 22.5    | 39.0 | 57.5 | 78.0  | 100.0 | 124.5 | 151.5 | 180.5 | 211.0 | 244.5 |
|                                       | Efficiency, %                         | 86.0    | 87.8 | 88.8 | 89.5  | 90.0  | 90.5  | 90.9  | 91.3  | 91.8  | 92.2  |
| 1½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 18.0    | 31.0 | 46.0 | 62.0  | 80.0  | 99.5  | 120.0 | 142.5 | 165.5 | 190.0 |
|                                       | Efficiency, %                         | 89.0    | 90.3 | 91.0 | 91.6  | 92.0  | 92.4  | 92.8  | 93.1  | 93.6  | 93.8  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 15.5    | 26.0 | 38.0 | 51.0  | 65.5  | 81.0  | 98.5  | 117.5 | 137.5 | 158.5 |
| 2"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 90.3    | 91.9 | 92.6 | 93.1  | 93.5  | 93.8  | 94.1  | 94.3  | 94.7  | 94.8  |
|                                       | Efficiency, %                         | 90.3    | 91.9 | 92.6 | 93.1  | 93.5  | 93.8  | 94.1  | 94.3  | 94.7  | 94.8  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 14.0    | 24.5 | 36.0 | 49.0  | 62.5  | 77.5  | 94.0  | 111.0 | 130.0 | 149.0 |
| Double Standard                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 91.2    | 92.3 | 92.9 | 93.4  | 93.8  | 94.1  | 94.3  | 94.6  | 94.9  | 95.1  |
|                                       | Efficiency, %                         | 91.2    | 92.3 | 92.9 | 93.4  | 93.8  | 94.1  | 94.3  | 94.6  | 94.9  | 95.1  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 13.0    | 22.5 | 33.0 | 44.5  | 57.0  | 71.0  | 85.5  | 101.0 | 117.5 | 134.5 |
| 2½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 91.9    | 93.0 | 93.5 | 94.0  | 94.3  | 94.6  | 94.9  | 95.1  | 95.4  | 95.6  |
|                                       | Efficiency, %                         | 91.9    | 93.0 | 93.5 | 94.0  | 94.3  | 94.6  | 94.9  | 95.1  | 95.4  | 95.6  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 12.0    | 21.0 | 30.5 | 41.0  | 52.5  | 65.5  | 78.5  | 93.0  | 108.5 | 124.0 |
| 3"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 92.5    | 93.4 | 94.0 | 94.5  | 94.8  | 95.0  | 95.3  | 95.5  | 95.7  | 95.9  |
|                                       | Efficiency, %                         | 92.5    | 93.4 | 94.0 | 94.5  | 94.8  | 95.0  | 95.3  | 95.5  | 95.7  | 95.9  |
|                                       |                                       | 6" PIPE |      |      |       |       |       |       |       |       |       |
| Uninsulated Standard                  | Approx. Btu Loss/Hr./Lin. Ft. of Pipe | 230     | 460  | 720  | 1060  | 1440  | 1890  | 2400  | 2990  | 3660  | 4450  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 27.0    | 49.0 | 74.0 | 102.0 | 133.5 | 168.0 | 207.5 | 251.5 | 300.0 | 352.0 |
|                                       | Efficiency, %                         | 88.3    | 89.4 | 89.7 | 90.4  | 90.7  | 91.1  | 91.4  | 91.6  | 91.8  | 92.1  |
| 1½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 22.0    | 39.0 | 57.5 | 79.0  | 102.5 | 129.5 | 159.0 | 190.5 | 225.5 | 262.0 |
|                                       | Efficiency, %                         | 90.4    | 91.5 | 92.0 | 92.5  | 92.9  | 93.1  | 93.4  | 93.6  | 93.8  | 94.1  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 19.0    | 33.0 | 47.5 | 64.0  | 83.0  | 103.0 | 126.0 | 151.0 | 178.0 | 207.0 |
| 2"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 91.7    | 92.8 | 93.4 | 94.0  | 94.2  | 94.6  | 94.7  | 95.0  | 95.1  | 95.3  |
|                                       | Efficiency, %                         | 91.7    | 92.8 | 93.4 | 94.0  | 94.2  | 94.6  | 94.7  | 95.0  | 95.1  | 95.3  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 18.5    | 31.5 | 46.0 | 61.5  | 78.5  | 97.5  | 118.5 | 141.0 | 164.5 | 189.0 |
| Double Standard                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 92.0    | 93.2 | 93.6 | 94.2  | 94.6  | 94.8  | 95.1  | 95.3  | 95.5  | 95.8  |
|                                       | Efficiency, %                         | 92.0    | 93.2 | 93.6 | 94.2  | 94.6  | 94.8  | 95.1  | 95.3  | 95.5  | 95.8  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 18.0    | 30.5 | 44.0 | 59.0  | 74.5  | 92.0  | 111.0 | 132.0 | 154.5 | 178.0 |
| 2½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 92.2    | 93.4 | 93.9 | 94.4  | 94.8  | 95.1  | 95.4  | 95.6  | 95.8  | 96.0  |
|                                       | Efficiency, %                         | 92.2    | 93.4 | 93.9 | 94.4  | 94.8  | 95.1  | 95.4  | 95.6  | 95.8  | 96.0  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 17.0    | 29.0 | 42.5 | 56.5  | 72.0  | 88.0  | 106.0 | 125.0 | 145.0 | 166.0 |
| 3"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 92.6    | 93.7 | 94.1 | 94.7  | 95.0  | 95.3  | 95.6  | 95.8  | 96.0  | 96.3  |
|                                       | Efficiency, %                         | 92.6    | 93.7 | 94.1 | 94.7  | 95.0  | 95.3  | 95.6  | 95.8  | 96.0  | 96.3  |
|                                       |                                       | 8" PIPE |      |      |       |       |       |       |       |       |       |
| Uninsulated Standard                  | Approx. Btu Loss/Hr./Lin. Ft. of Pipe | 300     | 580  | 940  | 1360  | 1850  | 2420  | 3080  | 3840  | 4720  | 5720  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 35.5    | 61.5 | 89.5 | 119.0 | 151.0 | 188.0 | 230.0 | 278.0 | 332.0 | 392.0 |
|                                       | Efficiency, %                         | 88.2    | 89.4 | 90.5 | 91.3  | 91.8  | 92.3  | 92.5  | 92.8  | 93.0  | 93.1  |
| 1½"                                   | Btu Loss/Hr./Lin. Ft. of Pipe         | 31.5    | 54.0 | 79.0 | 105.5 | 134.5 | 167.0 | 203.0 | 244.0 | 289.0 | 337.0 |
|                                       | Efficiency, %                         | 89.9    | 90.7 | 91.6 | 92.3  | 92.8  | 93.2  | 93.4  | 93.7  | 93.9  | 94.1  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 24.5    | 43.0 | 64.5 | 85.5  | 109.0 | 135.0 | 162.5 | 194.0 | 228.0 | 267.0 |
| 2"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 91.8    | 92.6 | 93.1 | 93.7  | 94.1  | 94.5  | 94.7  | 94.9  | 95.1  | 95.3  |
|                                       | Efficiency, %                         | 91.8    | 92.6 | 93.1 | 93.7  | 94.1  | 94.5  | 94.7  | 94.9  | 95.1  | 95.3  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 21.5    | 38.0 | 56.0 | 73.0  | 92.5  | 113.5 | 137.0 | 163.0 | 191.0 | 224.0 |
| Double Standard or 2½"                | Btu Loss/Hr./Lin. Ft. of Pipe         | 92.8    | 93.4 | 94.0 | 94.6  | 95.0  | 95.3  | 95.5  | 95.7  | 95.9  | 96.1  |
|                                       | Efficiency, %                         | 92.8    | 93.4 | 94.0 | 94.6  | 95.0  | 95.3  | 95.5  | 95.7  | 95.9  | 96.1  |
|                                       | Btu Loss/Hr./Lin. Ft. of Pipe         | 19.5    | 35.0 | 50.5 | 67.0  | 85.0  | 105.0 | 125.5 | 148.0 | 171.5 | 196.5 |
| 3"                                    | Btu Loss/Hr./Lin. Ft. of Pipe         | 93.5    | 94.0 | 94.6 | 95.1  | 95.4  | 95.7  | 95.9  | 96.1  | 96.4  | 96.6  |
|                                       | Efficiency, %                         | 93.5    | 94.0 | 94.6 | 95.1  | 95.4  | 95.7  | 95.9  | 96.1  | 96.4  | 96.6  |









FIBERGLAS PF. PIPE INSULATION (SECTIONAL)  
FOR STEAM OR HOT WATER LINES

THICKNESSES FOR VARIOUS  
TEMPERATURES AND PIPE SIZES

Fiberglas PF Pipe Insulation  
Temperatures from 111°F. to 599°F.

| Temperature<br>°F | Pipe<br>Under 2" | Pipes<br>2" to 4" | Pipes<br>over 4" |
|-------------------|------------------|-------------------|------------------|
| 111 to 299        | Standard         | Standard          | Standard         |
| 300 to 399        | 1 1/2"           | 1 1/2"            | 2"               |
| 400 to 499        | 1 1/2"           | 2"                | Double Std.      |
| 500 to 599        | 2"               | Double Std.       | 2 1/2"           |

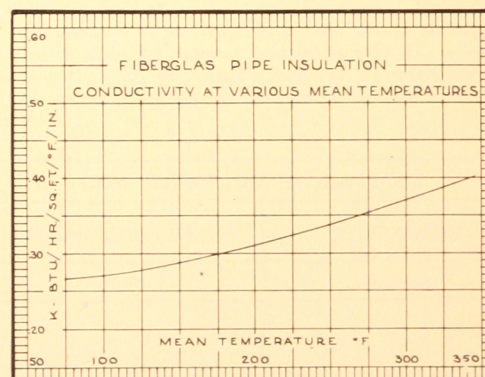
Temperatures from 600°F. to 799°F.

| Pipe Size | Total<br>Thickness | High Temperature<br>Pipe Insulation<br>Inner Layer | Fiberglas PF<br>Pipe Insulation<br>Outer Layer |
|-----------|--------------------|--|--|
| Under 2"  | 2"                 | 2"   | None   |
| 2"        | 3 1/4"             | 1 1/4"   | 2"   |
| 2 1/2"    | 3 9/16"            | 1 5/16"  | 2"   |
| 3" to 4"  | 3 9/16"            | 1 9/16"  | 2"   |
| Over 4"   | 4"                 | 1 1/2"   | 2 1/2"   |

Temperatures from 800°F. to 1000°F.

| Pipe Size | Total<br>Thickness | High Temperature<br>Pipe Insulation<br>Inner Layer | Fiberglas PF<br>Pipe Insulation<br>Outer Layer |
|-----------|--------------------|--|--|
| Under 2"  | 2"                 | 2"   | None   |
| 2"        | 3 5/8"             | 2 1/8"   | 1 1/2"   |
| 2 1/2"    | 3 5/16"            | 1 13/16"   | 1 1/2"   |
| 3" to 4"  | 3 9/16"            | 2 1/16"  | 1 1/2"   |
| Over 4"   | 4"                 | 2"   | 2"   |

CONDUCTIVITY AT VARIOUS  
MEAN TEMPERATURES

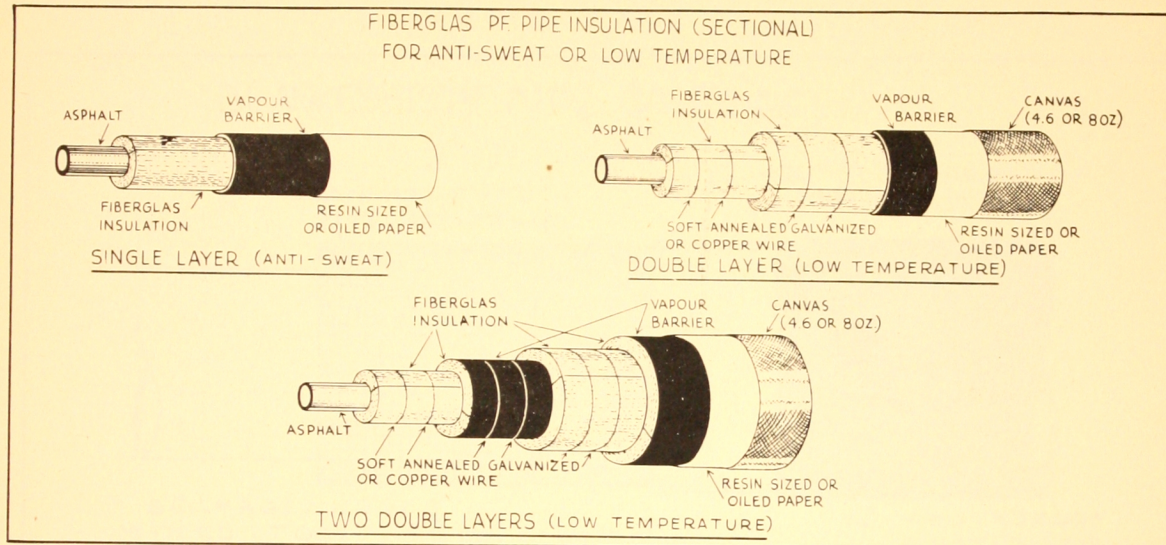








PIPE LINES



LOW TEMPERATURE INSTALLATIONS

PREPARATION OF SURFACE

All surfaces shall be thoroughly cleaned and dried before insulation is applied, and once installation has begun, the system shall not be put into operation until the application has been completed. Pipes and equipment to be insulated shall be re-located, if necessary to provide an uninterrupted clearance around the finished insulation of at least four (4) inches in all directions. Low temperature pipes shall not be located adjacent to heated surfaces.

APPLICATION OF INSULATION

The pipe surface to be (Fiberglas) insulated shall be primed or mopped with hot asphalt. Where one layer of double Standard is used, a suitable Vapour Barrier shall be installed on the outside of the outer layer. (Optional -- where one layer of double Standard is used, a suitable Vapour Barrier may be installed between the inner and outer layers, keeping the Vapour Barrier as thin as possible). Where two layers of Double Standard are applied the Vapour Barrier shall be placed between the inner two layers and the outer two layers, keeping the Vapour Barrier as thin as possible, and a second Vapour Barrier shall be placed on the outside of the outer two layers. All the joints in Pipe Coverings shall be staggered and joints in Vapour Barrier lapped 3 inches and sealed. Where single thickness pipe covering is applied a Vapour Barrier shall be applied on the outside only.

APPLICATION OF VAPOUR BARRIER

Over the final layer of Fiberglas, two layers of 15 pound saturated rag felt shall be applied with 3 inch laps, mopping each layer separately with hot asphalt.

A layer of resin-sized sheathing paper shall be applied over the final layer of 15 pound rag felt,

lapping it 3 inches at all points and sealing the laps with asphalt. A jacket of 8 ounce canvas shall then be sewn or pasted over the resin-sized paper. If sewn the stitches shall be spaced not less than three to the inch located where least visible.

OUTDOOR PROTECTION

The Fiberglas insulation shall be protected with a jacket of #28 gauge galvanized sheet metal or with a 55 pound roofing felt. If sheet metal is used, each sheet shall be lapped 3 inches against the weather at all points and permanently secured in place with 1-1/2 inch galvanized iron bands spaced on 8 inch to 12 inch centres. If roofing felt is used as a jacket, all points shall be lapped as above and the jacket permanently secured in place with 1/2" galvanized bands or with copper or soft galvanized wires spaced on 6 inch to 8 inch centres.

| LOW TEMP. INSTALLATIONS |           |
|-------------------------|-----------|
| TEMPERATURE             | THICKNESS |
| ° F.                    | Inches    |
| 45 to 15                | 2         |
| 15 to -5                | 3         |
| -5 to -20               | 4         |
| -20 to -40              | 5         |
| -40 to -60              | 6         |





THE FIRST PART OF THE REPORT  
IS A SUMMARY OF THE  
WORK DONE DURING THE  
YEAR 1964.

THE SECOND PART OF THE REPORT  
IS A SUMMARY OF THE  
WORK DONE DURING THE  
YEAR 1965.

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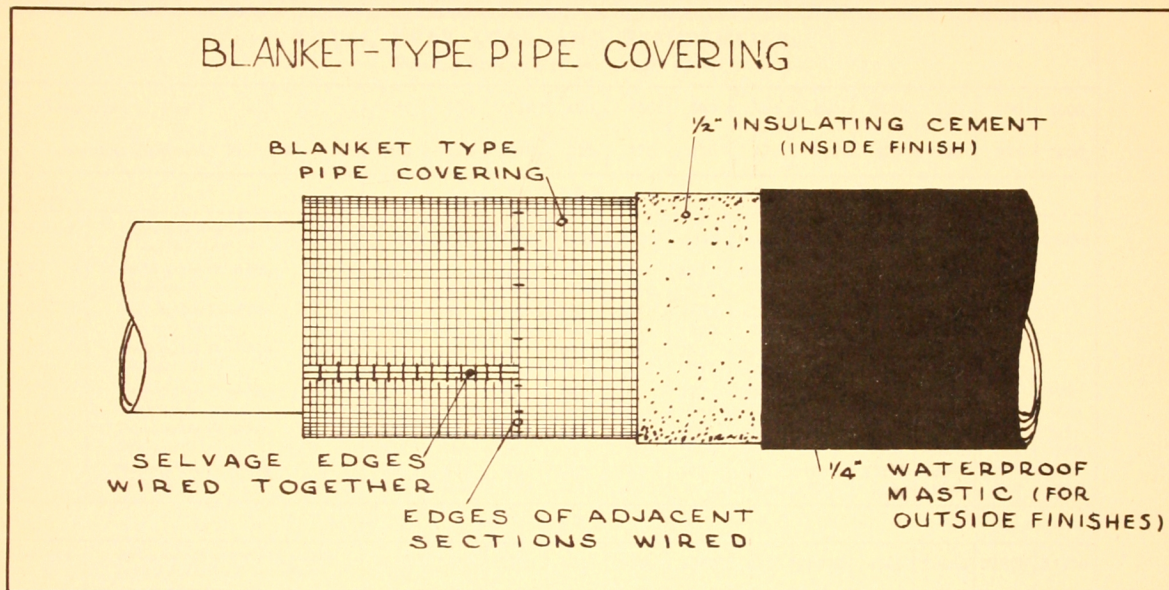
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YEAR 1971.

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YEAR 1974.





## FIBERGLAS BLANKET TYPE PIPE INSULATION

### APPLICATION

The light weight of this insulation makes it easy to handle, especially when large sizes are involved, or when working from ladders or scaffolding. Application is accomplished by the simple operation of wrapping the "blanket" around the pipe and lacing or tying the facing selvages together with No. 16 gauge soft iron galvanized wire, keeping the longitudinal joint along the bottom of the pipe or as close thereto as practical application permits. On bends, the selvages should be laced or tied together on the outside radius of the bend, permitting shortening of the wire mesh on the inside radius of the bend to conform to the contour of the pipe. When properly applied, uniform thickness and density of insulation results.

**WEATHERING.** The resistance to weathering of the glass fibers is exceptionally high as they are made of chemically stable glass.

**VIBRATION** has no apparent effect upon the continued efficiency of Fiberglas Blanket Type Pipe Insulation. Severe tests made upon flat blankets of lighter density, both under conditions of high humidity and temperature and also in normally dry air, showed no settlement or signs of breakdown after more than a million oscillations at various amplitudes.

**NONCORROSIVE.** Severe tests of Fiberglas in-

sulating wool in contact with both aluminum and steel, during which the test samples were subjected to alternating damp and dry conditions, indicate that these metals are in no wise injured by the presence of the glass fibers.

**SELECTION TABLE\***  
**FIBERGLAS PIPE INSULATION—BLANKET TYPE**

| Temperature<br>°F. | PIPE DIAMETERS |             |                     |
|--------------------|----------------|-------------|---------------------|
|                    | 3" UP TO 4"    | 4" UP TO 6" | 6" AND UP           |
| 150 to 250         | 1"             | 1"          | 1"                  |
| 251 to 350         | 1"             | 1"          | 1" <sup>R</sup>     |
| 351 to 450         | 1"             | 1"          | 1 1/2" <sup>G</sup> |
| 451 to 550         | 1"             | 1 1/2"      | 1 1/2"              |
| 551 to 650         | 1 1/2"         | 1 1/2"      | 2"                  |
| 651 to 750         | 1 1/2"         | 2"          | 2"                  |
| 751 to 900         | 2"             | 2"          | 2 1/2"              |
| 901 to 1050        | 2"             | 2 1/2"      | 3"                  |

\*Indoor Applications only. For piping located outdoors, or exposed to the weather, thickness of insulation should be not less than 1/2 inch greater than shown.







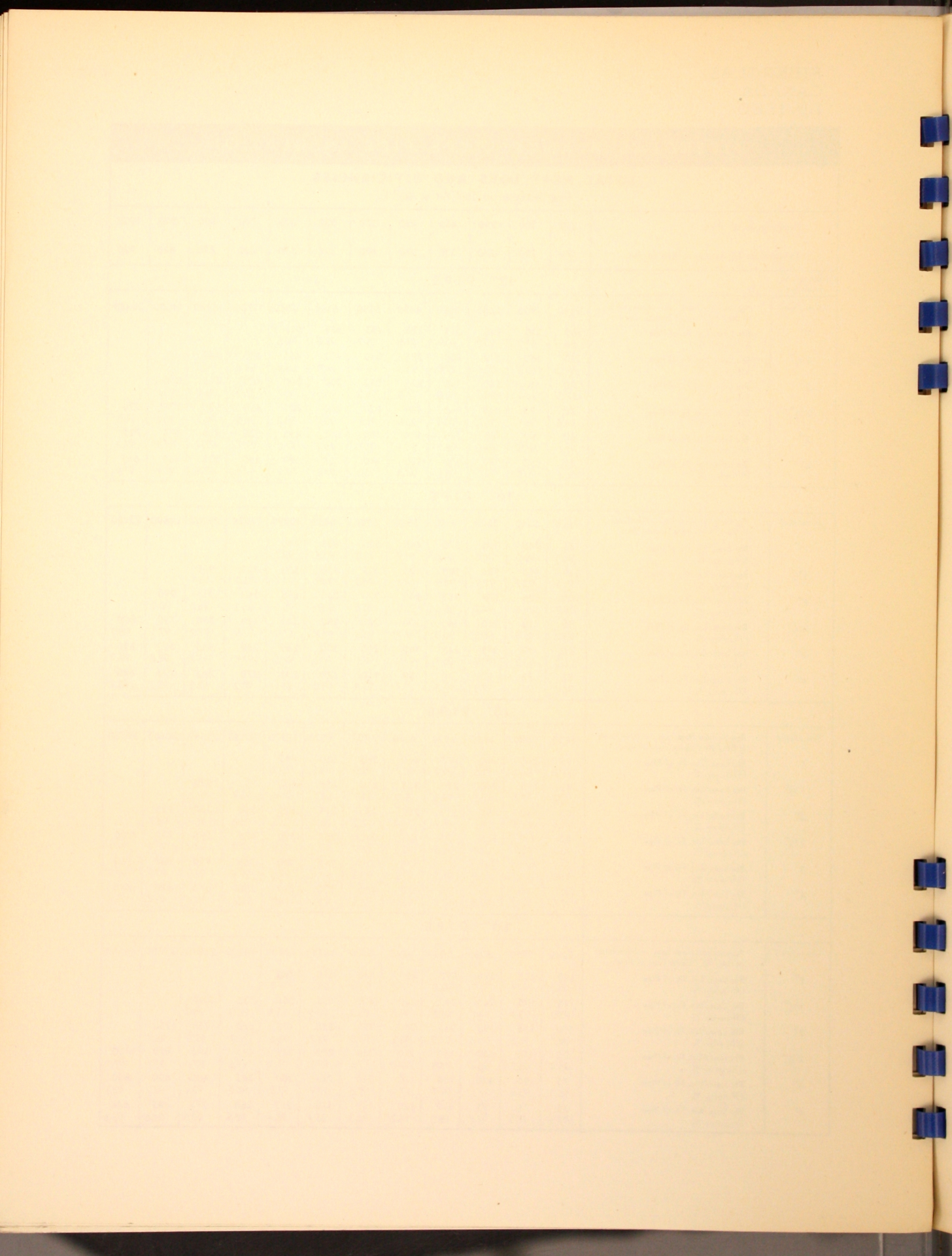
**FIBERGLAS BLANKET TYPE PIPE INSULATION**

**TOTAL HEAT LOSS AND EFFICIENCIES**

Pipe Surfaces in Still Air at 80° F.

| Temperature of Pipe                  |  | 250      | 300  | 350  | 400  | 450  | 500  | 550   | 600   | 700   | 800   | 900   | 1000  |
|--------------------------------------|--|----------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| Temperature Difference - Pipe to Air |  | 170      | 220  | 270  | 320  | 370  | 420  | 470   | 520   | 620   | 720   | 820   | 920   |
| Thickness of Insulation              |  | 12" PIPE |      |      |      |      |      |       |       |       |       |       |       |
| Uninsulated                          | Approximate Heat Loss - Uninsulated in Btu/Hr./Linear Foot of Pipe | 1340     | 1950 | 2660 | 3480 | 4480 | 5580 | 6850  | 8340  | 11780 | 16240 | 21620 | 28480 |
| 1"                                   | Btu Loss/Lin. Ft. of Pipe  | 160      | 210  | 260  | 315  | 375  | 455  | 535   | 625   |       |       |       |       |
|                                      | Efficiency %   | 88.1     | 89.2 | 90.2 | 90.9 | 91.6 | 91.9 | 92.2  | 92.5  |       |       |       |       |
| 1 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 120      | 160  | 210  | 250  | 285  | 340  | 410   | 465   | 635   | 840   |       |       |
|                                      | Efficiency %   | 91.0     | 91.8 | 92.1 | 92.8 | 93.6 | 93.9 | 94.0  | 94.4  | 94.6  | 94.8  |       |       |
| 2"                                   | Btu Loss/Lin. Ft. of Pipe  | 90       | 110  | 140  | 180  | 225  | 260  | 300   | 360   | 480   | 645   | 850   |       |
|                                      | Efficiency %   | 93.3     | 94.4 | 94.7 | 94.8 | 95.0 | 95.3 | 95.6  | 95.7  | 95.9  | 96.0  | 96.1  |       |
| 2 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 70       | 95   | 115  | 145  | 180  | 220  | 260   | 305   | 405   | 530   | 730   | 990   |
|                                      | Efficiency %   | 94.8     | 95.1 | 95.7 | 95.8 | 96.0 | 96.1 | 96.2  | 96.3  | 96.6  | 96.7  | 96.6  | 96.5  |
| 3"                                   | Btu Loss/Lin. Ft. of Pipe  | 60       | 80   | 105  | 135  | 160  | 180  | 215   | 250   | 330   | 430   | 575   | 765   |
|                                      | Efficiency %   | 95.1     | 95.5 | 96.0 | 96.2 | 96.4 | 96.8 | 96.9  | 97.0  | 97.2  | 97.4  | 97.3  | 97.3  |
| 4"                                   | Btu Loss/Lin. Ft. of Pipe  | 45       | 63   | 80   | 100  | 120  | 140  | 165   | 190   | 255   | 335   | 450   | 610   |
|                                      | Efficiency %   | 96.6     | 96.8 | 97.0 | 97.1 | 97.3 | 97.5 | 97.6  | 97.7  | 97.8  | 97.9  | 97.9  | 97.9  |
|                                      |  | 16" PIPE |      |      |      |      |      |       |       |       |       |       |       |
| Uninsulated                          | Approximate Heat Loss - Uninsulated in Btu/Hr./Linear Foot of Pipe | 1650     | 2410 | 3300 | 4310 | 5500 | 6860 | 8450  | 10290 | 14580 | 20060 | 26800 | 35400 |
| 1"                                   | Btu Loss/Lin. Ft. of Pipe  | 185      | 240  | 305  | 370  | 445  | 535  | 635   | 760   |       |       |       |       |
|                                      | Efficiency %   | 88.8     | 90.0 | 90.8 | 91.4 | 91.9 | 92.2 | 92.5  | 92.7  |       |       |       |       |
| 1 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 140      | 190  | 235  | 280  | 320  | 395  | 450   | 530   | 710   | 980   |       |       |
|                                      | Efficiency %   | 91.5     | 92.2 | 92.9 | 93.5 | 94.2 | 94.3 | 94.7  | 94.9  | 95.2  | 95.1  |       |       |
| 2"                                   | Btu Loss/Lin. Ft. of Pipe  | 105      | 135  | 170  | 205  | 245  | 290  | 340   | 405   | 540   | 715   | 990   |       |
|                                      | Efficiency %   | 94.0     | 94.4 | 94.9 | 95.3 | 95.6 | 95.8 | 96.0  | 96.1  | 96.3  | 96.5  | 96.3  |       |
| 2 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 80       | 110  | 140  | 160  | 200  | 240  | 280   | 315   | 420   | 570   | 790   | 1090  |
|                                      | Efficiency %   | 95.2     | 95.5 | 95.8 | 96.3 | 96.4 | 96.5 | 96.7  | 97.0  | 97.1  | 97.2  | 97.1  | 96.9  |
| 3"                                   | Btu Loss/Lin. Ft. of Pipe  | 70       | 90   | 115  | 145  | 165  | 200  | 230   | 260   | 350   | 465   | 620   | 830   |
|                                      | Efficiency %   | 95.8     | 96.3 | 96.5 | 96.7 | 97.0 | 97.1 | 97.3  | 97.5  | 97.6  | 97.7  | 97.7  | 97.7  |
| 4"                                   | Btu Loss/Lin. Ft. of Pipe  | 55       | 72   | 90   | 110  | 130  | 150  | 170   | 205   | 270   | 365   | 475   | 640   |
|                                      | Efficiency %   | 96.7     | 97.1 | 97.3 | 97.5 | 97.7 | 97.8 | 98.0  | 98.1  | 98.2  | 98.2  | 98.3  | 98.2  |
|                                      |  | 18" PIPE |      |      |      |      |      |       |       |       |       |       |       |
| Uninsulated                          | Approximate Heat Loss - Uninsulated in Btu/Hr./Linear Foot of Pipe | 1850     | 2680 | 3680 | 4820 | 6170 | 7700 | 9520  | 11520 | 16450 | 22550 | 30100 | 39750 |
| 1"                                   | Btu Loss/Lin. Ft. of Pipe  | 190      | 240  | 310  | 375  | 460  | 545  | 660   | 780   |       |       |       |       |
|                                      | Efficiency %   | 89.9     | 91.0 | 91.6 | 92.2 | 92.7 | 92.9 | 93.1  | 93.2  |       |       |       |       |
| 1 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 145      | 195  | 240  | 290  | 335  | 390  | 455   | 530   | 715   | 990   |       |       |
|                                      | Efficiency %   | 92.2     | 92.7 | 93.5 | 94.0 | 94.7 | 94.9 | 95.2  | 95.4  | 95.7  | 95.6  |       |       |
| 2"                                   | Btu Loss/Lin. Ft. of Pipe  | 105      | 145  | 180  | 210  | 255  | 295  | 345   | 405   | 550   | 740   | 995   |       |
|                                      | Efficiency %   | 94.4     | 94.6 | 95.1 | 95.7 | 96.0 | 96.2 | 96.4  | 96.5  | 96.6  | 96.7  | 96.7  |       |
| 2 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 85       | 110  | 145  | 170  | 205  | 240  | 280   | 320   | 425   | 585   | 790   | 1180  |
|                                      | Efficiency %   | 95.4     | 95.9 | 96.1 | 96.5 | 96.8 | 96.9 | 97.1  | 97.2  | 97.3  | 97.4  | 97.4  | 97.1  |
| 3"                                   | Btu Loss/Lin. Ft. of Pipe  | 75       | 95   | 120  | 150  | 170  | 210  | 245   | 280   | 365   | 480   | 630   | 850   |
|                                      | Efficiency %   | 96.0     | 96.5 | 96.8 | 96.9 | 97.2 | 97.3 | 97.4  | 97.6  | 97.8  | 97.9  | 97.9  | 97.9  |
| 4"                                   | Btu Loss/Lin. Ft. of Pipe  | 55       | 75   | 95   | 110  | 120  | 150  | 170   | 210   | 280   | 370   | 485   | 640   |
|                                      | Efficiency %   | 97.0     | 97.2 | 97.4 | 97.7 | 98.1 | 98.1 | 98.2  | 98.2  | 98.3  | 98.4  | 98.4  | 98.4  |
|                                      |  | 20" PIPE |      |      |      |      |      |       |       |       |       |       |       |
| Uninsulated                          | Approximate Heat Loss - Uninsulated in Btu/Hr./Linear Foot of Pipe | 2040     | 2950 | 4080 | 5330 | 6820 | 8500 | 10520 | 12800 | 18200 | 24940 | 33500 | 44200 |
| 1"                                   | Btu Loss/Lin. Ft. of Pipe  | 190      | 255  | 330  | 390  | 465  | 570  | 670   | 740   |       |       |       |       |
|                                      | Efficiency %   | 90.7     | 91.4 | 91.9 | 92.8 | 93.2 | 93.4 | 93.7  | 94.3  |       |       |       |       |
| 1 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 145      | 195  | 240  | 295  | 340  | 410  | 465   | 555   | 735   | 1010  |       |       |
|                                      | Efficiency %   | 93.0     | 93.4 | 94.1 | 94.6 | 95.0 | 95.3 | 95.6  | 95.8  | 96.0  | 96.0  |       |       |
| 2"                                   | Btu Loss/Lin. Ft. of Pipe  | 110      | 135  | 180  | 215  | 260  | 300  | 350   | 415   | 560   | 755   | 1230  |       |
|                                      | Efficiency %   | 94.7     | 95.5 | 95.6 | 96.0 | 96.2 | 96.5 | 96.7  | 96.8  | 96.9  | 97.0  | 96.4  |       |
| 2 1/2"                               | Btu Loss/Lin. Ft. of Pipe  | 95       | 115  | 150  | 170  | 210  | 250  | 290   | 335   | 445   | 595   | 820   | 1300  |
|                                      | Efficiency %   | 95.4     | 96.1 | 96.4 | 96.8 | 97.0 | 97.1 | 97.2  | 97.3  | 97.5  | 97.6  | 97.6  | 97.1  |
| 3"                                   | Btu Loss/Lin. Ft. of Pipe  | 75       | 95   | 120  | 150  | 170  | 210  | 245   | 280   | 365   | 480   | 630   | 850   |
|                                      | Efficiency %   | 96.3     | 96.8 | 97.1 | 97.3 | 97.5 | 97.6 | 97.7  | 97.8  | 98.0  | 98.1  | 98.2  | 98.1  |
| 4"                                   | Btu Loss/Lin. Ft. of Pipe  | 55       | 75   | 95   | 110  | 120  | 150  | 170   | 210   | 280   | 370   | 485   | 640   |
|                                      | Efficiency %   | 97.3     | 97.5 | 97.7 | 98.0 | 98.2 | 98.3 | 98.4  | 98.4  | 98.5  | 98.6  | 98.6  | 98.6  |







TYPICAL METHOD OF APPLYING FIBERGLAS BLANKET  
TYPE PIPE INSULATION TO A 90° BEND



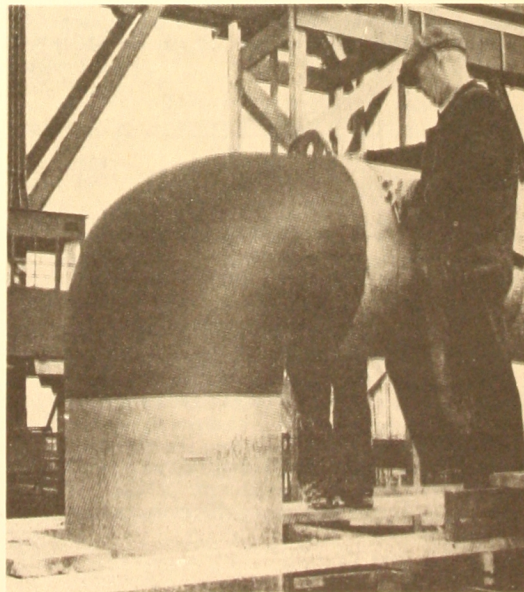
1 The insulation is cut to proper shapes, using wire snips for the wire netting and metal edge and an ordinary knife for the insulating wool.



2 The shapes are fitted in place and the individual wires at the edges twisted together. A smooth, tight, concentric insulation is the result.

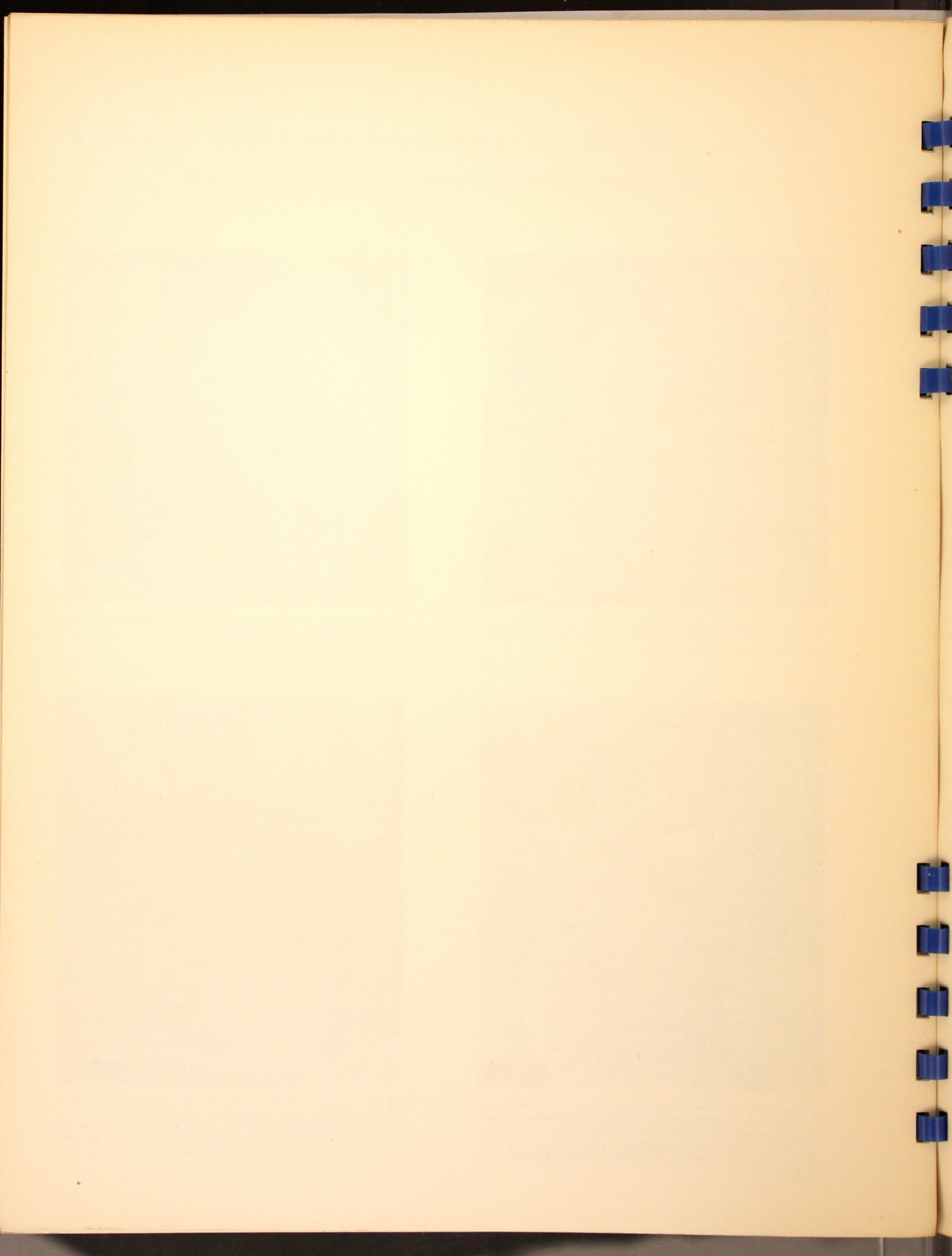


3 On bends or other irregular surfaces, a sheet metal jacket may be impractical. Fibreglass Insulating Cement is applied over the insulation and troweled smooth. For outdoor applications, a weatherproof coating of Mastic Finish is applied after the Insulating Cement has thoroughly dried.



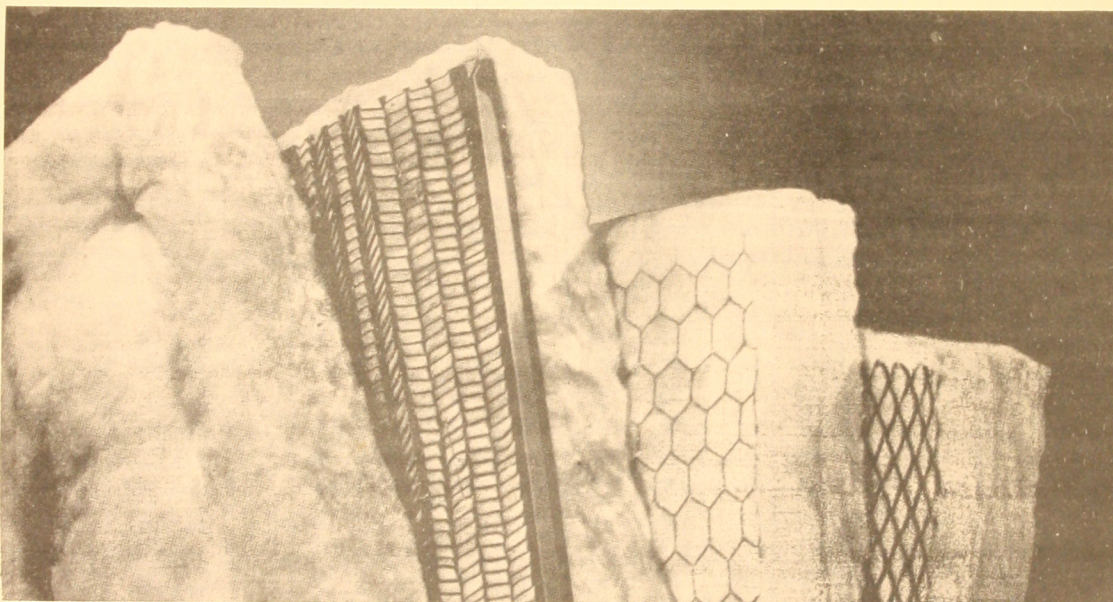
4 On straight piping, a jacket of No. 28 gauge galvanized sheet metal may be applied. The metal jacket is installed to overlap by several inches the Mastic Finish on the adjacent bend. It is secured in place with 1/2" or 3/4" galvanized bands, machine stretched or crimped on approximately 8" to 12" centers.







## FIBERGLAS METAL MESH BLANKETS



Fiberglas\* Metal Mesh Blankets are flexible blankets of glass insulating wool faced on one or both sides with a metal mesh. Such facing fixes blanket position and provides a base for cement finishes.

### USES

Fiberglas Metal Mesh Blankets are used for insulating heated industrial equipment in temperature ranges up to 1000° F. Such equipment includes boilers, cylinders, industrial ovens, large ducts and breechings, railway tank cars, stationary tanks, oil field and refinery equipment.

### TYPES

Fiberglas Metal Mesh Blankets are fabricated into two types as follows:

Type No. 900 Blankets, are made of Fiberglas Insulating Wool, Type TW-F, described in Fiberglas Standards D4.2.1. Density of the wool is approximately 6 lbs. per cu. ft. One side often is without facing so as to conform to surface irregularities and projections, such as laps, rivet heads, etc. No. 900 Blankets can be used on hot surfaces at temperatures up to 1000° F.

Type No. 600 Blankets are made of Fiberglas PFL Insulation, described in Fiberglas Standards D4.3.1. Density of the wool averages 4-1/4 lbs. per cu. ft. In many applications but one side is faced because of the semi-rigid characteristic of Fiberglas PFL Insulation. No. 600 Blankets can be used on hot surfaces at temperatures up to 600° F.

### PERFORMANCE IN SERVICE

**VIBRATION.** Fiberglas Metal Mesh Blankets, properly fastened in place do not sag, settle, or change in thickness. On the contrary, vibration fluffs out the wool fibers, thereby filling any voids.

**NON-CORROSIVE.** Severe tests, in which samples are subjected to alternating damp and dry conditions, prove Fiberglas Insulating Wools have no corrosive effects in contact with aluminum and steel.

**LIGHT WEIGHT.** Net weights per sq. ft., including facings and wire or asbestos cord ties, for various styles of Fiberglas Metal Mesh Blankets, Types No. 900 and No. 600, are shown below.

### HEAT CAPACITY

The low heat capacity of Fiberglas Insulating Wool is explained in Fiberglas Standards D4.2.1. For purposes of rapid computation, heat capacities of Fiberglas Metal Mesh Blankets, based on a specific heat of .20 Btu per lb., exclusive of facing materials, are as follows:

| Blanket Type | Per Sq. Ft., 1" Thick<br>(Btu per Degree F.) | Per Cu. Ft.<br>(Btu per Degree F.) |
|--------------|--|------------------------------------|
| No. 900      | .100   | 1.20                               |
| No. 600      | .075   | .90                                |

### SIZES

Fiberglas Metal Mesh Blankets are fabricated into two standard sizes: 2 feet by 8 feet, and 2 feet by 4 feet. Special sizes are fabricated on order at extra cost.

### INSULATING EFFECTIVENESS

Selection Charts on page 4 show the thicknesses of Types No. 900 and No. 600 Blankets required to decrease flat surface temperatures to desired levels. Comparisons of surface temperatures and heat losses in Btu per hr. per sq. ft. in still air at 80° F., prior to and after insulation, also are obtainable from the charts. In addition, thermal efficiencies of insulation are easily computed by use of the equation

$$100\% - \left( \frac{\text{Cold Surface Btu Loss}}{\text{Hot Surface Btu Loss}} \times 100 \right)$$





1. The purpose of this document is to provide a clear and concise summary of the information contained in the attached report.

2. The information contained in this document is intended to be used for informational purposes only and should not be used as a basis for any decision-making process.

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FIBERGLAS METAL MESH BLANKET - No. 900

| HEAT LOSSES AND EFFICIENCIES                        |              |      |      |      |      |      |      |      |      |      |      |      |
|---|--------------|------|------|------|------|------|------|------|------|------|------|------|
| Flat Surfaces in Still Air at 80° F.                |              |      |      |      |      |      |      |      |      |      |      |      |
| Temperature of Hot Surface - °F                     | 250          | 300  | 350  | 400  | 450  | 500  | 550  | 600  | 700  | 800  | 900  | 1000 |
| Temperature Difference -<br>Hot Surface to Air - °F | 170          | 220  | 270  | 320  | 370  | 420  | 470  | 520  | 620  | 720  | 820  | 920  |
| Bare Heat Loss -<br>Btu per hour per sq. ft.        | 430          | 610  | 850  | 1100 | 1400 | 1750 | 2130 | 2570 | 3650 | 5000 | 6650 | 8700 |
| Thickness   |              |      |      |      |      |      |      |      |      |      |      |      |
| 1"  | Btu Loss     | 38   | 51   | 65   | 81   | 100  | 120  | 144  | 173  |      |      |      |
|   | Efficiency % | 91.2 | 91.6 | 92.4 | 92.6 | 92.9 | 93.1 | 93.2 | 93.3 |      |      |      |
| 1½"   | Btu Loss     | 29   | 38   | 48   | 60   | 72   | 86   | 103  | 122  | 169  |      |      |
|   | Efficiency % | 93.3 | 93.8 | 94.3 | 94.5 | 94.9 | 95.1 | 95.2 | 95.3 | 95.4 |      |      |
| 2"  | Btu Loss     | 23   | 29   | 36   | 45   | 54   | 65   | 78   | 92   | 128  | 176  |      |
|   | Efficiency % | 94.7 | 95.2 | 95.8 | 95.9 | 96.1 | 96.2 | 96.3 | 96.4 | 96.5 | 96.5 |      |
| 2½"   | Btu Loss     | 18   | 24   | 31   | 38   | 45   | 53   | 63   | 75   | 103  | 141  |      |
|   | Efficiency % | 95.8 | 96.1 | 96.4 | 96.6 | 96.8 | 97.0 | 97.0 | 97.1 | 97.2 | 97.2 |      |
| 3"  | Btu Loss     | 16   | 20   | 25   | 31   | 38   | 45   | 53   | 62   | 87   | 119  | 161  |
|   | Efficiency % | 96.3 | 96.7 | 97.1 | 97.2 | 97.3 | 97.4 | 97.5 | 97.6 | 97.6 | 97.6 | 97.6 |
| 3½"   | Btu Loss     | 13   | 18   | 22   | 27   | 32   | 38   | 45   | 54   | 75   | 102  | 139  |
|   | Efficiency % | 97.0 | 97.1 | 97.4 | 97.5 | 97.7 | 97.8 | 97.9 | 97.9 | 98.0 | 98.0 | 97.9 |
| 4"  | Btu Loss     | 11   | 15   | 18   | 23   | 27   | 33   | 39   | 47   | 65   | 90   | 123  |
|   | Efficiency % | 97.4 | 97.5 | 97.9 | 98.0 | 98.1 | 98.1 | 98.2 | 98.2 | 98.2 | 98.2 | 98.2 |
| 5"  | Btu Loss     | 9    | 12   | 15   | 19   | 22   | 26   | 31   | 37   | 51   | 71   | 96   |
|   | Efficiency % | 97.9 | 98.0 | 98.2 | 98.3 | 98.4 | 98.5 | 98.5 | 98.6 | 98.6 | 98.6 | 98.6 |
| 6"  | Btu Loss     | 7    | 9    | 12   | 15   | 17   | 20   | 25   | 30   | 42   | 58   | 80   |
|   | Efficiency % | 98.4 | 98.5 | 98.6 | 98.6 | 98.8 | 98.9 | 98.8 | 98.8 | 98.8 | 98.8 | 98.8 |

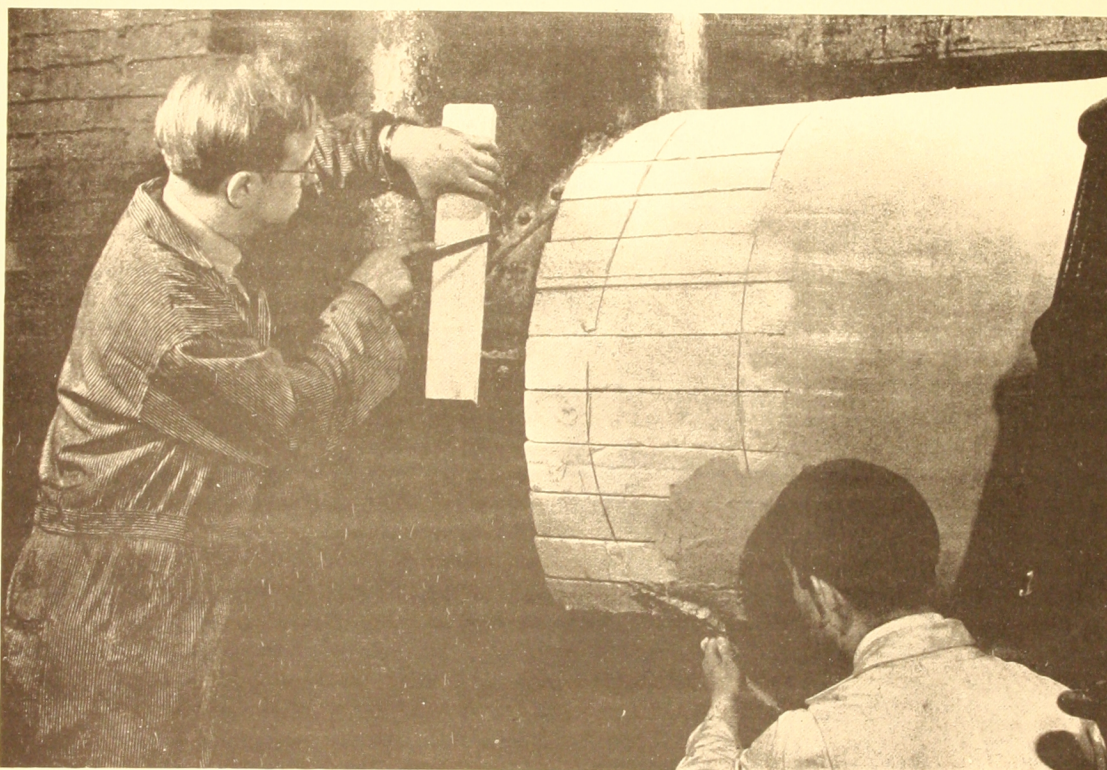
| FIBERGLAS METAL MESH BLANKETS                            |                                      |                     |
|--|--------------------------------------|---------------------|
| Styles and Facing Materials                              |                                      |                     |
| STYLE  | ONE SIDE                             | OPPOSITE SIDE       |
| HH   | Hexagonal Wire<br><br>(Poultry Mesh) | Hexagonal Wire      |
| †HO  |                                      | No Metal Facing     |
| HL   |                                      | Expanded Metal Lath |
| †LO  | Expanded Metal Lath                  | No Metal Facing     |
| LL   |                                      | Expanded Metal Lath |
| †ATRO  | Rib Turned OUT                       | No Metal Facing     |
| †RATO  | Rib Turned IN                        | No Metal Facing     |
| ATRH   | $\frac{3}{8}$ " Rib Lath             | Hexagonal Wire      |
| RATH   |                                      | Hexagonal Wire      |
| ATRL   |                                      | Expanded Metal Lath |
| RATL   |                                      | Expanded Metal Lath |
| †Featured Construction of Fiberglas Metal Mesh Blankets. |                                      |                     |

| FIBERGLAS METAL MESH BLANKETS               |              |              |
|---|--------------|--------------|
| Types and Thicknesses Generally Recommended |              |              |
| For Hot Surfaces                            | Type No. 900 | Type No. 600 |
| 100°—200° F                                 | 1" Thick     | 1" Thick     |
| 201°—300° F                                 | 1½" "        | 1½" "        |
| 301°—400° F                                 | 2" "         | 2" "         |
| 401°—600° F                                 | 2½" "        | 2½" "        |
| 601°—700° F                                 | 3" "         |              |
| 701°—850° F                                 | 3½" "        |              |
| 851°—1000° F                                | 4" "         |              |









## FIBERGLAS HIGH TEMPERATURE INSULATING BLOCKS APPLICATION

Fiberglas No. 600 Block Insulation can be applied to flat or curved surfaces in accordance with standard insulation practice, using bands or tie-wires to hold them in place. They may be reinforced with 1" galvanized wire, then covered with Fiberglas Insulating Cement, and finished with Fiberglas Finishing Cement or Mastic Finish.

When Fiberglas No. 600 Block Insulation is applied to equipment operating above 400° F., the block should be applied while surfaces are not above 400° F. and the unit brought to maximum heat slowly the first time.

**THERMAL CONDUCTIVITY.** The thermal conductivity of Fiberglas No. 600 Block Insulation is .26 Btu per hour per square foot per inch thickness per degree F., at a mean temperature of 70° F.

**FLEXURAL STRENGTH.** The flexural strength of Fiberglas No. 600 Block Insulation is approximately 60 pounds per square inch.

**TEMPERATURE LIMIT.** The recommended temperature limit of Fiberglas No. 600 Block Insulation is 600° F.

**HANDLING QUALITIES.** Fiberglas No. 600 Block Insulation has excellent handling qualities. It is easily cut and fitted and has adequate strength for shipment and application under ordinary service conditions. It does not tend to crumble.

### DIMENSIONS OF BLOCKS

| Fiberglas<br>No. 600 Block                        |   |
|---|---|
| Standard<br>Sizes                                 | 6" x 36"<br>12" x 36"                         |
| Special Sizes<br>(Made on<br>order only)          | 6" x 18"    12" x 18"<br>3" x 36"    3" x 18" |
| Standard<br>Thicknesses                           | 3/4", 1", 1 1/2", 2"                          |
| Special<br>Thicknesses<br>(Made on<br>order only) | —   |





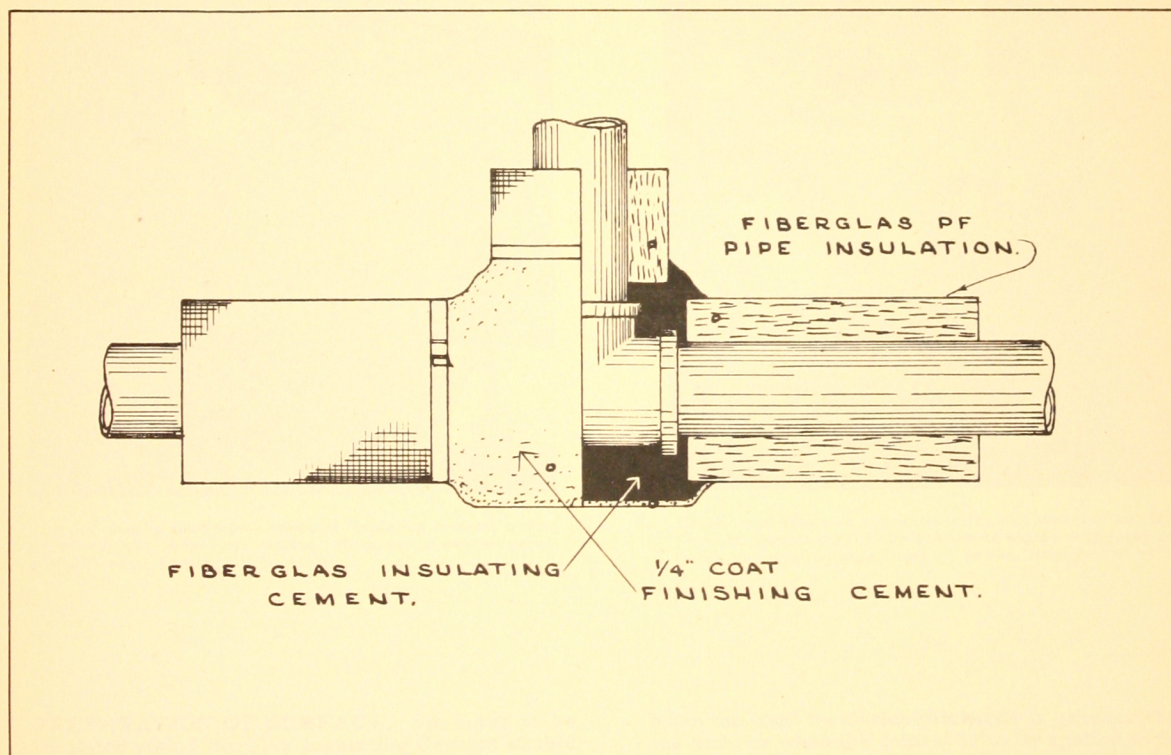
# THE HISTORY OF THE UNITED STATES

The history of the United States is a story of growth and change. From the first settlers to the present day, the nation has evolved through many challenges and triumphs. The early years were marked by exploration and settlement, followed by a period of rapid expansion and industrialization. The American Revolution and the Civil War were pivotal moments in the nation's history, shaping its identity and values. The 20th century brought significant social and political changes, including the rise of the American Dream and the struggle for civil rights. Today, the United States continues to grow and change, facing new challenges and opportunities in the 21st century.

The United States is a country of many different people and cultures. Each group has contributed to the nation's history and identity. The American people are proud of their freedom and the values they stand for. They believe in the American Dream, the idea that anyone can achieve success through hard work and determination. The United States is a country of opportunity, where people can start their own businesses and create their own futures. The American people are also proud of their military and the role it plays in protecting the nation's freedom and security. The United States is a country of hope, where people believe in a better future for themselves and for their children. The American people are proud of their country and the values they stand for. They believe in the American Dream, the idea that anyone can achieve success through hard work and determination. The United States is a country of opportunity, where people can start their own businesses and create their own futures. The American people are also proud of their military and the role it plays in protecting the nation's freedom and security. The United States is a country of hope, where people believe in a better future for themselves and for their children.



## FIBERGLAS INSULATING CEMENT



FIBERGLAS INSULATING CEMENT provides a monolithic insulation for pipes, tank, ovens, and other heated equipment; both regular or irregular shapes, indoors and out. It combines good thermal insulating value and ease of application. It may be used over steel, brick, and insulation blocks and blankets. When located outdoors or exposed to moisture or abrasion, a jacket of sheet metal or a coating of Mastic Finish should be applied to protect the cement.

Fiberglas Insulating Cement is made of nodulated Fiberglas Insulation, dry-mixed with refractory-type materials. It is easily mixed on the job. Approximately 28 gallons of clean fresh water should be used for each 100 lbs. of dry cement. When the cement is to be used on a hot porous surface such as fire brick, an additional 4 gallons per 100 lbs. of cement should be used. When ap-

plied and dried, it comprises countless dead air cells.

Fiberglas Insulating Cement is easy to apply, a feature that lowers installation time. Other advantages include full reclaimability up to 1000° F., low shrinkage on drying, good adhesive strength, and the provision of an excellent base for either Fiberglas Finishing Cements or Mastic Finish.

**THERMAL CONDUCTIVITY** of Fiberglas Insulating Cement is not more than .75 Btu sq. ft. per hour, per degree F. temperature difference, per inch thickness of material, at a mean temperature of 300° F.; and .64 Btu at 100° F. mean temperature. (See chart on page 3 for conductivity at various mean temperatures.)



# THE HISTORY OF THE UNITED STATES

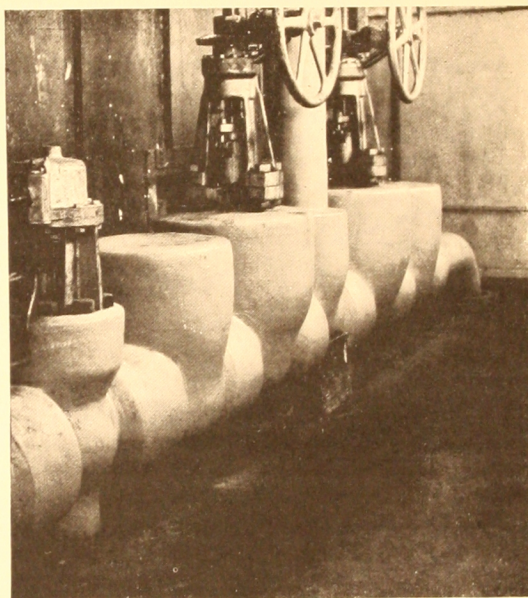


The history of the United States is a story of growth and change. It begins with the first settlers, who came to the land in search of a better life. They found a land of opportunity, but also a land of challenge. The early years were marked by struggle and hardship, but the spirit of the pioneers was strong. They built a nation, one state at a time, and their legacy lives on in the hearts of the people. The story of the United States is a story of hope and dreams, of a land where everyone has a chance to make their own future.





The workman is applying a coating of insulating cement, which, adheres firmly to the wire netting. When dry, a weatherproof coat of Mastic Finish will be applied.



Plastic and adhesive characteristics of Fiberglas Insulating Cement permit direct application to highly irregular surfaces and around pipe flanges, bends, fittings and valves.

**PREPARATION OF SURFACE.** Surfaces to be insulated with Fiberglas Insulating Cement should be cleaned of dirt, loose scale, paint, oil or grease. Paint or grease should be removed with a caustic solution which then should be washed off with clean fresh water. Porous surfaces, such as fire brick, should be wet down thoroughly before the application of the insulating cement. If possible, the surface to be insulated should be kept hot to facilitate drying the cement.

**REINFORCEMENT.** Anchorage, where required or specified, should be provided in the form of clip angles, nuts or masonry nails of proper size. Additional support is recommended when cement is to be applied to light gauge metallic surfaces or when the surface expansion and contraction is excessive.

**APPLICATION ON STEEL SURFACES.** Fiberglas Insulating Cement of the recommended thickness (see table page 3) should be built up in separate coats not greater than  $3/4$ ". The first coat should be spotted on by hand then completely roughed in. Subsequent coats,  $3/4$ " thick or less, should be applied after the preceding coats have dried until the total recommended thickness is reached.

When the total insulation thickness is greater than one inch; or when the cement is to be applied to the under side of equipment; or, when the equipment is subject to vibration, a layer of galvanized wire netting should be applied between every second coat. When used, the wire netting should be stretched tightly over the dry cement and securely wired in place with 16 gauge galvanized wire.

**APPLICATION ON BRICK SURFACES.** Fiberglas Insulating Cement should be applied to a thickness that will result in a safe temperature gradient for all materials in the composite construction. Where reinforcing is required, masonry nails approximately  $1-1/2$ " long should be driven into the mortar joints on approximately 8- to 12-inch centers so that the heads extend  $3/4$ " from the surface of the brick. The first layer of cement should be applied nearly flush with the nail heads. Then galvanized wire netting should be stretched tightly over the cement and secured to the nails. The second layer of insulating cement should be applied approximately  $1/2$ " to  $3/4$ " thick.

#### APPLICATION OF FINISH

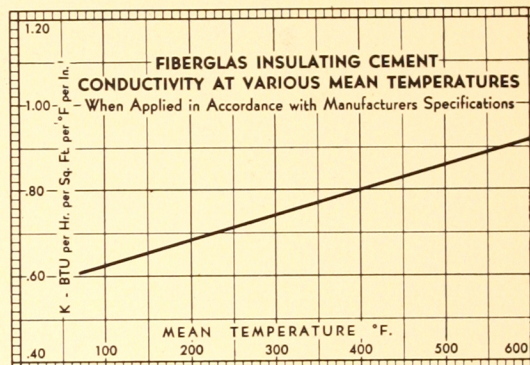
Fiberglas Insulating Cement may be finished with Finishing Cement if located indoors and not exposed to moisture or abrasion; or with Mastic Finish when located out of doors or exposed to moisture.







MASTIC FINISH is usually applied over a base coat of either insulating or finishing cement. It should be stirred thoroughly in the container before application. Prior to the application of the Mastic Finish and after the cement has thoroughly dried, 1" galvanized wire netting should be stretched tightly over the surface and wired in place with 16 gauge wire. The finish should be trowelled in place approximately 1/4" thick (wet), which will dry to about 1/8". It is important that it is trowelled well into the wire netting.



### CHARACTERISTICS OF CEMENT & FINISHES

| Physical Properties | Fiberglas Insulating Cement  |
|---------------------|--|
| Wet Coverage        | 62 board feet per 100 pounds.  |
| Dry Coverage        | 52 board feet per 100 pounds.  |
| Appearance When Dry | Light tan, relatively smooth, hard finish  |
| Temperature Limits  | Recommended to 1400 degrees F. Can be used to 1500 degrees F. — Fully reclaimable to 1000 degrees F. |

### RECOMMEND THICKNESS FOR INSULATING CEMENT\*

| ° F          | Thickness (Inches) |
|--------------|--------------------|
| Up to 200    | 1                  |
| 200 to 400   | 1½                 |
| 400 to 500   | 2½                 |
| 500 to 600   | 3                  |
| 600 to 700   | 3½                 |
| 700 to 900   | 4                  |
| 900 to 1100  | 4½                 |
| 1100 to 1300 | 5                  |
| 1300 to 1600 | 5½                 |

\* Usually applied 1/2" thick over blankets and blocks as a base coat for desired finish. For built-up applications on irregular surfaces, thicknesses may be used up to the practical limit.





A series of tests were made with a  
 view to determining the effect of  
 varying the percentage of cement  
 in the concrete. The results are  
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 will be seen that the strength  
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 given in the following table. It  
 will be seen that the strength  
 of the concrete decreases as the  
 percentage of cement is increased.

### RECOMMENDED THICKNESS FOR WALLING CEMENT

| Percentage of Cement | Thickness of Walling |
|----------------------|----------------------|
| 10                   | 1/2 inch             |
| 20                   | 3/4 inch             |
| 30                   | 1 inch               |
| 40                   | 1 1/4 inch           |
| 50                   | 1 1/2 inch           |
| 60                   | 1 3/4 inch           |
| 70                   | 2 inch               |
| 80                   | 2 1/4 inch           |
| 90                   | 2 1/2 inch           |
| 100                  | 2 3/4 inch           |

### CHARACTERISTICS OF CEMENT & FINISHES

| Finish            | Characteristics  |
|-------------------|--|
| Smooth            | Even surface, no texture.                                    |
| Brushed           | Surface with a fine, uniform texture.                        |
| Knocked           | Surface with a coarse, irregular texture.                    |
| Scabbled          | Surface with a very coarse, irregular texture.               |
| Exposed aggregate | Surface with a coarse, irregular texture, showing aggregate. |
| Polished          | Surface with a smooth, glossy finish.                        |
| Stained           | Surface with a uniform color, achieved by staining.          |
| Painted           | Surface with a uniform color, achieved by painting.          |